

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-16. (Cancelled).

Claim 17 (Currently Amended) A method for preparing a thermal barrier coating protected by infiltrated alumina that overlies a metal substrate, the method comprising the steps of:

1. providing a thermal barrier coating overlaying a metal substrate, the thermal barrier coating including a porous outer layer having an exposed surface and comprising a non-alumina ceramic thermal barrier coating material in an amount up to 100%;
2. treating the porous outer layer with a liquid composition comprising an alumina precursor to infiltrate the porous outer layer with the alumina precursor in an amount sufficient to provide, when converted to alumina, at least partial protection of the thermal barrier coating against environmental contaminants that become deposited on the exposed surface; and
3. converting in situ the infiltrated alumina precursor within the porous outer layer to alumina.

Claim 18 (Original) The method of claim 17 wherein a bond coat layer is adjacent to and overlies the metal substrate of step (1) and wherein the outer layer is formed on the bond coat layer.

Claim 19 (Original) The method of claim 18 wherein the liquid composition comprises from about 5 to about 50% alumina precursor.

Claim 20 (Original) The method of claim 19 wherein the liquid composition comprises from about 10 to about 20% alumina precursor.

Claim 21 (Original) The method of claim 19 wherein the alumina precursor is selected from the group consisting of aluminum alkoxides, aluminum β -diketonates, aluminum alkyls and alumina sols.

Claim 22 (Original) The method of claim 21 wherein the alumina precursor is an aluminum alkoxide selected from the group consisting of aluminum methoxides, aluminum ethoxides, aluminum propoxides, aluminum isopropoxides, aluminum butoxides, aluminum sec-butoxides and mixtures thereof.

Claim 23 (Original) The method of claim 22 wherein step (3) comprises thermally converting the infiltrated aluminum alkoxide to alumina.

Claim 24 (Original) The method of claim 23 wherein step (3) comprises heating the infiltrated aluminum alkoxide to a temperature of at least about 1200°F for a period of at least about 2 hours.

Claim 25 (Original) The method of claim 24 wherein step (3) comprises heating the infiltrated aluminum alkoxide to a temperature of from about 1200° to about 1500°F for a period of at least about 4 hours.

Claim 26 (Original) The method of claim 23 wherein the infiltrated aluminum alkoxide is thermally converted to finely divided alpha alumina.

Claim 27 (Original) The method of claim 22 wherein the liquid composition is an aqueous composition.

Claim 28 (Original) The method of claim 27 wherein the liquid composition further comprises a polar organic liquid solvent selected from the group consisting of alcohols, aldehydes, ketones and mixtures thereof.

Claim 29 (Original) The method of claim 19 wherein the outer layer is treated with the liquid composition for a period of from about 0.1 to about 30 minutes.

Claim 30 (Original) The method of claim 29 wherein the outer layer is treated with the liquid composition for a period of from about 1 to about 5 minutes.

Claim 31 (Cancelled).

Claim 32 (Currently Amended) A method comprising the following steps:

1. providing a thermal barrier coating overlaying a metal substrate of a turbine component, the thermal barrier coating including a porous outer layer having an exposed surface and comprising a non-alumina ceramic thermal barrier coating material in an amount up to 100%;
2. treating the porous outer layer with a liquid composition comprising an alumina precursor to infiltrate the porous outer layer with the alumina precursor in an amount sufficient to provide, when converted to alumina, at least partial protection of the thermal barrier coating against environmental contaminants that become deposited on the exposed surface, wherein the turbine component is in an assembled state when the porous outer layer is treated with the liquid composition; and
3. converting in situ the infiltrated alumina precursor within the porous outer layer to alumina.

Claim 33. (Previously Presented) The method of claim 32 wherein the liquid composition comprises from about 5 to about 50% alumina precursor and wherein the alumina precursor is selected from the group consisting of aluminum alkoxides, aluminum β -diketonates, aluminum alkyls and alumina sols.

Claim 34. (Previously Presented) The method of claim 33 wherein the alumina precursor is an

aluminum alkoxide selected from the group consisting of aluminum methoxides, aluminum ethoxides, aluminum propoxides, aluminum isopropoxides, aluminum butoxides, aluminum sec-butoxides and mixtures thereof.

Claim 35. (Previously Presented) The method of claim 34 wherein step (3) thermally converting the infiltrated aluminum alkoxide to alumina.

Claim 36. (Previously Presented) The method of claim 35 wherein the infiltrated aluminum alkoxide is thermally converted to finely divided alpha alumina.

Claim 37. (Previously Presented) The method of claim 32 wherein the liquid composition is an aqueous composition.

Claim 38. (Previously Presented) The method of claim 32 wherein step (1) comprises providing a refurbished thermal barrier coating that overlays the metal substrate of the turbine component.